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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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EXAMINER

LAROSE, COLIN M

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| | 2623 |

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/911,912 | YOUNGERS, KEVIN J. | |
| | Examiner | Art Unit | |
| | Colin M. LaRose | 2623 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-18 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2,3.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 18 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 17.

When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-4 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent 6,215,529 by Sugimoto et al. (“Sugimoto”).

Regarding claim 1, Sugimoto discloses a method (figure 5) of processing color image data, comprising:

- (a) examining a color component of a pixel in the image (figure 5: an input value of the R-Y color component is “examined”);
- (b) selectively applying a tone map to the color component of the pixel to create an output color component only when the color component is not in a dark area of the image (figure 5: if the R-Y color component is below the Lb value (i.e. “in a dark area”), the value is passed

without change, since the gradient of the tone curve is one in the dark region; otherwise, tone mapping is applied, and the (R-Y) color component value is modified according to the tone curve above the Lb threshold).

Regarding claim 2, Sugimoto discloses repeating steps (a) and (b) for essentially each pixel in the image (i.e. the characteristic curve for figure 5 is applied to every pixel in the image).

Regarding claim 3, Sugimoto discloses blending the transition between pixels in the image that are in a dark area and pixels in the image that are not in a dark area (figure 5: the transition region between Lb and Lc is a blend of the dark and light region curves).

Regarding claim 4, Sugimoto discloses the tone map is using a gamma correction curve (i.e. figure 5 is a gamma correction curve).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,636,229 by Ishikawa et al. (“Ishikawa”) in view of U.S. Patent 4,831,434 by Fuchsberger.

Regarding claim 5, Ishikawa discloses a method (figure 5, wherein blocks 114, 115, and 116 correspond to block 100 in figure 1) of processing color image data contained in an array of pixels, comprising:

selecting at least one threshold (figure 2 shows the correction curve utilized by each block in figure 5; each block selects a threshold “A” for each respective correction curve);

(a) reading a color component of a pixel (i.e. R, G, and B input values are read);

(b) transforming the color component of the pixel with a tone map when the color component of the pixel is greater than the threshold (figure 2: if the input color component is above the A value, then the color component is corrected according to the gradation curve in the “b”, “c”, and “d” regions).

Ishikawa does not disclose “preserving the color component” when the color component value is below a threshold.

As shown in figure 2, it appears that the gradient of the correction curve in the “a” region is one, which corresponds to the output value being identical to the input value. That is, with a slope of one in the “a” region, the color component is preserved.

However, Ishikawa does not expressly disclose that the slope of the curve in the “a” region is one. It merely appears to be one upon visual inspection.

Fuchsberger discloses a color-correction system (figure 7), wherein color component signals are corrected (21). The correction curve shown in figure 6 is applied to each of the color component signals in order to suppress color saturation (column 7, lines 16-28). In particular,

Fuchsberger teaches that the slope of the correction curve is equal to one in regions of dark color, thereby preserving the color component in those regions (figure 6 and column 7, lines 29-35).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ishikawa by Fuchsberger to achieve the claimed invention by preserving the color component in dark regions (i.e. set Ishikawa's "gradient a" equal to 1), since Fuchsberger discloses that for the color correction of an image, it is desirable to preserve the color components in dark regions while changing the color component in lighter regions (see figure 6). Furthermore, Ishikawa teaches that the "gradient a" value is a pre-determined value and may be changed according to desired output characteristics (column 4, lines 52-59). This suggests that the "gradient a" value may be set to any of a number of values in order to meet design specifications or performance criteria.

Regarding claim 6, Ishikawa discloses repeating steps (a) and (b) for essentially each pixel in the array (i.e. the characteristic curve for figure 2 is applied to every pixel in the image).

Regarding claim 7, Ishikawa teaches that steps (a) through (b) are repeated to create a new output color component for each of the color components in the color image (figure 5: each of the three color components are processed).

Regarding claim 8, Ishikawa teaches that the "A" value is independently specified for each of the three color signals, thereby allowing a different threshold to be used for each color component (column 4, lines 53-59: the "A" value is independently set for each color component correction circuit in figure 5).

Regarding claim 9, Ishikawa teaches that there are different tone maps for creating each output color component in the color image (i.e. the slopes (a,b,c,d) and break points (A,B,C) for each of the three tone curves are independently specified).

Regarding claims 10 and 11, Ishikawa does not expressly disclose the claimed values as the threshold. However, since Ishikawa allows the “A” threshold value to be specified as any value, those skilled in the art would have known to set the threshold to a certain value according to design specifications or performance criteria. Since the claimed threshold values appear to correspond to design and implementation criteria, and since they do not appear to be critical inventive steps or lend to unexpected results, they are deemed to be an obvious feature to those skilled in the art.

6. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,481,317 by Hieda in view of U.S. Patent 4,831,434 by Fuchsberger.

Regarding claim 12, Hieda discloses a scanner (figure 1), comprising:
a photo-sensor array for converting an image into an electrical signal (camera 1);
an A-to-D converter to convert the electrical signal into raw digital data (A/D 3);
a tone map for transforming the raw digital data into corrected digital data (gamma correction 13).

Hieda does not disclose the scanner is configured to output the corrected digital data only when the raw digital data is greater than a pre-selected value. As shown in figure 3, when the input value is less than the threshold x_1 , the output value is equal to four times the input value.

Fuchsberger discloses a color-correction system (figure 7), wherein color component signals are corrected (21). The correction curve shown in figure 6 is applied to each of the color component signals in order to suppress color saturation (column 7, lines 16-28). In particular, Fuchsberger teaches that the slope of the correction curve is equal to one in regions of dark color that are below a threshold, thereby preserving the color component in those regions (figure 6 and column 7, lines 29-35). This is equivalent to the correction curve not being applied to the input value, since the input value is simply passed without change.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hieda by Fuchsberger to output corrected color component image data only when the image data exceeds a predetermined value, since Fuchsberger shows that correcting only input values of a color component signal above a certain threshold achieves desirable color correction.

Regarding claim 14, Hieda and Fuchsberger disclose repeating steps (a) and (b) for essentially each pixel in the array (i.e. the characteristic curves for both Hieda and Fuchsberger are applied to every pixel in the image).

7. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hieda in view of Fuchsberger as applied to claim 12 above, and further in view of U.S. Patent 6,636,229 by Ishikawa et al. ("Ishikawa").

Regarding claim 16, Hieda and Fuchsberger do not disclose that a different threshold is used to create each output color component in the color image. It appears that in both systems, the same thresholds are used for all color components.

Ishikawa teaches a system that corrects color signals according to a characteristic curve such as shown in figure 2. Ishikawa also discloses that a characteristic curve is applied to each color component signal (figure 5) and that the parameters for each characteristic are independently set and adjusted (column 4, lines 53-59: the parameters a, b, c, d, A, B, and C are set for each of the correction circuits in figure 5).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hieda and Fuchsberger by Ishikawa so that the thresholds for each of the color components are different, since Ishikawa teaches that the threshold (i.e. break point "A"), as well as the other curve parameters, are set so that they conform to the different correction characteristics of each of the color components and thereby produce a more effective correction of the image signal (column 8, lines 26-36).

8. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,481,317 by Hieda in view of U.S. Patent 6,215,529 by Sugimoto et al. ("Sugimoto").

Regarding claims 17 and 18, Hieda discloses a camera, comprising:
a photo sensor and a lens system that forms an image on the photo sensor (camera 1, figure 1);
a tone map for mapping image data (gamma corrector 13, figure 1).

Hieda does not disclose that the image data is mapped only when it exceeds a predetermined value. As shown in figure 3, when the input value is less than the threshold x_1 , the output value is equal to four times the input value.

Sugimoto discloses a gamma compensation curve (figure 5) similar to that of Hieda. Sugimoto discloses that when the input value is less than a threshold (L_b), the output value is equal to the input value. This is equivalent to the gamma correction curve not being applied to the input value, since the input value is simply passed without change.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hieda by Sugimoto to map the image data only when the image data exceeds a predetermined value, since Sugimoto shows that correcting only input values of a color component signal above a certain threshold achieves desirable color correction.

9. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,753,987 by Farnung et al. ("Farnung") in view of U.S. Patent 5,287,418 by Kishida.

Regarding claim 13, Farnung discloses a method (see figure 13) of processing data contained in an array of pixels, comprising:

defining a threshold (midpoint 710);

defining a range around the threshold, the range having a top end (upper offset 740) and a bottom end (lower offset 730);

defining a tone map (i.e. figure 13 shows a tone map);

(a) reading a color component of a pixel (i.e. the input L^* component ("L* IN") is read and transformed according to the tone map);

(b) applying the tone map to the color component when the color component is above the top of the high end (i.e. when the L* IN value is above the upper offset 740, then the tone map in the upper region is applied);

(c) modifying the color component when the color component is below the top end of the high range and above the bottom end of the low range (i.e. the color component is modified according the tone map in the mid-range region when the L* IN value is between the upper and lower offsets); and

(d) otherwise preserving the color component (i.e. when the L* IN value is below the lower offset 730, the tone map preserves its value; see column 8, lines 46-54: the tone mapping is 1:1 in the lower region).

Farnung is silent to modifying the mid-range by interpolation, as claimed.

Kishida discloses a method of tone conversion of image data, similar to that of Farnung, wherein an input value is mapped to a corresponding output value via a gradation conversion curve (see figure 3). In particular, Kishida discloses that two different tone curves, f_1 and f_2 , are created for different image regions, R_1 and R_2 , as shown in figure 5. For the purposes of deriving a tone mapping, the two tone curves for the respective regions are blended to form a resulting tone curve, f_d . As can be seen in figure 3, the output of the mid-range densities is generated according to the composite f_d curve, which is an interpolation of the f_1 and f_2 curves. Therefore, the output of the mid-range densities is essentially an interpolation of the tone curves f_1 and f_2 .

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Farnung by Kishida to modify the color components in the mid-range by interpolation, since Kishida discloses that a composite tone curve that interpolates density values for the mid-range region allows the desired contributions of regional tone curves to be selected for application to the overall tone curve (column 2, lines 13-22).

Regarding claim 15, Farnung does discloses applying the tone curve to only the L* color component, however, Kishida discloses applying the tone curves to each of the color components in the image (column 4, lines 38-41). This provides more versatility in tone correction since each color component is individually corrected.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.

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CML
Group Art Unit 2623
22 July 2004

A handwritten signature in black ink, appearing to read "CML". The signature is fluid and cursive, with a large, rounded loop on the left and several smaller loops and lines extending to the right.